

Response
Serial No. 10/511,396
Attorney Docket No. 042879

AMENDMENTS TO THE CLAIMS:

Listing of claims:

This listing of claims replaces all prior versions and listings of claims in the application.

Claim 1 (Original): A method of forming a resistive film on a surface of a sample comprising the steps of:

rotating the sample at a rotational speed with the sample being held in a substantial horizontal situation;

dropping a liquid film material on the sample surface while the sample is being rotated, to form a resistive film thereon; and

dropping a solvent which solves the resistive film formed on the sample surface while the sample is being rotated at a rotational speed, thereby dissolving a part of the resistive film to obtain the resistive film having a desired level of thickness.

Claim 2 (Original): A method according to Claim 1, wherein the desired level of the thickness of the resistive film is 0.1 nm to 10 nm.

Claim 3 (Original): A method according to Claim 1 or 2, wherein the resistive film is water-soluble.

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Claim 4 (Previously presented): A method according to Claim 1 or 2, the sample is at least one of a semiconductor wafer, photo mask and reticle mask.

Claim 5 (Original): An apparatus for forming a resistive film on a surface of a sample comprising:

a spin coater which drops a liquid film material on the sample surface while the sample is being rotated at a rotational speed with the sample being held in a substantial horizontal situation, thereby forming a resistive film on the sample surface; and

a film thickness uniformizing mechanism which makes the thickness of the resistive film formed on the sample surface thin and uniform by dissolving a part of the resistive film with a solvent.

Claim 6 (Original): An apparatus according to Claim 5, wherein the film thickness uniformizing mechanism includes a solvent dropping device which drops a solvent dissolving the resistive film while the sample is being rotated.

Claim 7 (Original): An apparatus according to Claim 5 or 6, the sample is at least one of a semiconductor wafer, photo mask and reticle mask.

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Claim 8 (Original): A method of inspecting a surface of a sample comprising the steps of;

coating the sample surface with a resistive film having an arbitrarily determined thickness;

dissolving a part of the resistive film, to thereby reduce the thickness of the resistive film to a desired level which is thinner than that of the arbitrarily determined thickness; and

irradiating a charged particle beam to the sample surface coated with the resistive film, to thereby conduct inspection of the sample surface.

Claim 9 (Original): A method according to Claim 8, wherein the desired level of the thickness of the resistive film is 0.1 nm to 10 nm.

Claim 10 (Original): A method according to Claim 8 or 9, wherein the resistive film is water-soluble.

Claim 11 (Previously presented): A method according to Claim 8 or 9, further comprising the step of removing the resistive film from the sample surface by cleaning it with pure water or ultrapure water after the inspection of the sample surface.

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Claim 12 (Previously presented): A method according to Claim 8 or 9, the sample is at least one of a semiconductor wafer, photo mask and reticle mask.

Claim 13 (Original): A method of manufacturing a semiconductor device comprising the step of:

inspecting a semiconductor wafer in the middle of a manufacturing process and/or after completion of the manufacturing process by a surface inspection method according to Claim 12.

Claim 14 (Original): A system for inspecting a surface of a sample comprising:

a surface flattening mechanism for flattening the sample surface;

a resistive film coating mechanism for coating a resistive film on the sample surface after the surface is flattened by the surface flattening mechanism, the resistive film having an arbitrarily determined thickness, and then dissolving a part of the resistive film in a solvent, to thereby reduce the thickness of the resistive film to a desired level;

an inspection mechanism for emitting a charged particle beam to the sample surface having the resistive film coated thereon, to thereby conduct inspection of the sample surface; and

a conveyor mechanism for conveying the sample between the mechanisms.

Claim 15 (Original): A system according to Claim 14, further comprising a cleaning mechanism and a sample drying mechanism so that the sample in a clean and dry state is

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introduced into and removed from the surface inspection apparatus, wherein the surface flattening mechanism, the resistive film coating mechanism, the inspection mechanism, the cleaning mechanism and the sample drying mechanism are disposed so as to surround the conveyor mechanism.

Claim 16 (Original): A system according to Claim 14 or 15, the sample is at least one of a semiconductor wafer, photo mask and reticle mask.

Claim 17 (Original): A method of manufacturing a semiconductor device comprising the step of:

inspecting a semiconductor wafer in the middle of a manufacturing process and/or after completion of the manufacturing process using a surface inspection system according to Claim 16.

Claim 18 (Original): A mechanism for inspecting a surface of a sample, comprising:

an electromagnetic wave irradiation apparatus comprising an electromagnetic wave source, and a device for guiding an electromagnetic wave generated from the electromagnetic wave source onto a sample surface;

a detector for detecting electrons emitted from the sample surface which is irradiated with the electromagnetic wave to output an electric or optical signal; and

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a processing unit for processing the electric or optical signal from the detector for evaluation of the sample surface.

Claim 19 (Original): A mechanism according to Claim 18, wherein the electromagnetic wave source comprises a source which irradiates an ultraviolet or X-ray laser.

Claim 20 (Original): A mechanism according to Claim 18, wherein the electromagnetic wave source comprises a source which irradiates an ultraviolet ray or X-ray having a wavelength of 400 nm or less.

Claim 21 (Original): A mechanism according to any one of Claims 18-20, further comprising:

an electron beam irradiation apparatus comprising an electron beam source, and a device for guiding an electron beam generated from the electron beam source onto the sample surface; and

an apparatus for driving one or both of the electromagnetic wave irradiation apparatus and the electron beam irradiation apparatus to irradiate the sample surface with one or both of the electromagnetic wave or the electron beam.

Claim 22 (Previously presented): A mechanism according to any one of Claims 18 - 20,

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further comprising:

an imaging optical system for guiding the electrons emitted from the sample surface to the detector.

Claim 23 (Previously presented): A mechanism according to any one of Claims 18- 20, the sample is at least one of a semiconductor wafer, photo mask and reticle mask.

Claim 24 (Original): A method of manufacturing a semiconductor device comprising the step of:

inspecting a semiconductor wafer in the middle of a manufacturing process and/or after completion of the manufacturing process using a surface inspection mechanism according to Claim 23.

Claim 25 (Previously presented): A system for inspecting a surface of a sample comprising:

a surface flattening mechanism for flattening the sample surface;

a resistive film coating mechanism for coating a resistive film on the sample surface after the surface is flattened by the surface flattening mechanism, the resistive film having an arbitrarily determined thickness, and then dissolving a part of the resistive film in a solvent, to thereby reduce the thickness of the resistive film to a desired level;

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a surface inspection mechanism according to any one of Claims 18- 20 for conducting inspection of the sample surface having the resistive film thereon; and
a conveyor mechanism for conveying the sample between the mechanisms.

Claim 26 (Original): A system according to Claim 25, further comprising a cleaning mechanism and a sample drying mechanism so that the sample in a clean and dry state is introduced into and removed from the surface inspection apparatus, wherein the surface flattening mechanism, the resistive film coating mechanism, the inspection mechanism, the cleaning mechanism and the sample drying mechanism are disposed so as to surround the conveyor mechanism.

Claim 27 (Previously presented): A system for inspecting a surface of a sample comprising:

a mechanism for flatting the sample surface; and
a surface inspection mechanism according to any one of Claims 18-20 for conducting inspection of the sample surface which has been flattened.

Claim 28 (Previously presented): A system for inspecting a surface of a sample comprising:

a mechanism for coating a resistive film on the sample surface; and

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a surface inspection mechanism according to any one of Claims 18-20 for conducting inspection of the sample surface which has been coated with the resistive film.

Claim 29 (Previously presented): A system according to Claim 26, the sample is at least one of a semiconductor wafer, photo mask and reticle mask.

Claim 30 (Original): A method of manufacturing a semiconductor device comprising the step of:

inspecting a semiconductor wafer in the middle of a manufacturing process and/or after completion of the manufacturing process using a system according to Claim 29.

Claim 31 (New): A mechanism according to Claim 18, wherein the detector comprises a CCD or TDI.

Claim 32 (New): A mechanism according to Claim 18, further comprising an image signal processing unit which is adapted to compare a plurality of images to each other.